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title for the period covered—from 1530 to about 1603. The reader is likely to dissent from the inference that the work of Brunfels, Fuchs, Gesner and others constitutes the “new biology” which was more properly the product of the nineteenth century. Nevertheless, his account of the naturalists of this period is very interesting. In the works of Brunfels and Fuchs we find recognition of the practical utility of *affinities* for the systematic arrangement of plants, as well as sketches from nature published before the appearance of the “*Fabrica*” of Vesalius. This is notable, for there was little objective treatment of science at this time, and few sketches from nature before those prepared under Vesalius, the drawings of Leonardo da Vinci on anatomy being the most notable exceptions.

There are some omissions not readily accounted for. For illustration, one misses reference to the work and the great influence of Vesalius, Harvey, Spallanzani, and the Hunters. These men lived in the period under consideration and, judged in the light of their influence on the developing science of biology, they were founders in as large a sense as any others mentioned. The work of Vesalius served to open the field of morphological studies, and that of Harvey to introduce experimental observation into biological science. While Vesalius might possibly be ruled out, on the ground that his observations were not broadly morphological but applied chiefly to the human body, this is not the case of Harvey, who was not only physiologist but comparative anatomist and observer in embryology as well. Harvey is incidentally mentioned in connection with the embryological work of Malpighi, but his influence was great enough to make him worthy of separate treatment. Spallanzani and John Hunter were naturalists in a broad sense and deserving of representation. Probably Haller should also have some mention.

There are in the book many evidences of ripe scholarship and extensive learning, with an unusually limited number of mistakes. In the section on “Early Studies in Comparative Anatomy” it is probably an error to designate the Essay on Comparative Anatomy of Alex-

ander Munro primus as the earliest formal treatment on the subject. The “*Zootomia Democritæ*” of Severinus, published a century earlier (1645), is a more likely competitor for this distinction.

It is to be regretted that there are no illustrations in the volume. Portraits of the more notable observers and illustrations selected from their numerous plates would have added greatly to the interest of the book.

The reviewer has read the volume with interest, and while venturing to point out some of its limitations, he is at the same time sensible of its merits.

WM. A. LOCY

The Chemistry of Plant and Animal Life. By HARRY SNYDER, B.S. Third Revised Edition. New York, The Macmillan Company. Pp. xxii + 388. Price \$1.50.

The scope of this little volume is in some respects even wider, in others considerably narrower, than its title would lead one to expect. Of the two parts into which it is divided the first, comprising about two fifths of the text, constitutes a brief introductory course in general chemistry, presenting in elementary fashion the fundamental concepts and laws of the science, and reviewing those elements and simple compounds that from an agricultural standpoint are the most important. The second deals with certain selected phases of biochemical science, such as the characteristic organic compounds of plants and animals, the chemistry of plant growth, the composition of cereals and coarse fodders, the chemistry of digestion and nutrition, and the rational feeding of animals and men. Nearly every chapter contains, besides its expository paragraphs, a number of appropriate problems and laboratory exercises. The whole “is the outgrowth of instruction in chemistry given in the school of agriculture of the University of Minnesota.”

The book is, of course, hardly more than a primer, and from a primer much that is interesting and even important must be rigidly excluded. On the other hand, the process of elimination may be pushed too far; and the

reviewer may be permitted to doubt whether the most elementary treatment of the chemistry of life can, for instance, afford to neglect such substances as the amino-acids, or to omit from its vocabulary the word "metabolism." The fact that amino-acids appear sometimes to be vaguely referred to among the "amides" does not diminish the seriousness of the first defect; nor is the second excused by the author's peculiar use of the word "digestion." Digestion, it would seem, is employed to signify not merely the preparation of food for its absorption, but also its subsequent fate within the organism. When this has been grasped it is possible to understand such remarkable statements as that "in order that digestion may proceed in a normal way, a liberal supply of air is necessary to oxidize the nutrients," or that when carbohydrates are "completely digested, carbon dioxide and water are the final products," or that "during . . . digestion, heat is produced in proportion to the calories contained in the food . . . digested."

In discussing the "Nitrogenous Compounds of Plants" the author retains the term "proteid," now generally abandoned by English-speaking chemists. He classifies casein as an "albuminate," vitellin as a "globulin-like body," nuclein and mucin as "albuminoids." The system of protein nomenclature adopted by the American Society of Biological Chemists and the American Physiological Society receives, indeed, no recognition whatever. The doctrine of ferments and fermentation is another theme that might with advantage have been cast in a more modern form. The concept of a ferment does not to-day include such things as the "tubercular organism," and the once important distinction between "organized" and "soluble" ferments has now little more than a historical interest. It is to be regretted that a "revised edition" should perpetuate terminologies and methods of presentation that, to say the least, are obsolescent.

If the weight of these criticisms be allowed to depend to some extent upon the individual point of view, it is otherwise with the actual misstatements that are occasionally encoun-

tered. Some of these, to be sure, are mere slips, as when nitrogen is said to constitute "23 per cent." of the atmosphere; others argue chiefly a lack of precision, as when carbon is said to be "present in plant and animal bodies in larger amounts than any other element." But there are several positive blunders. Wax is stated to contain "an ethyl radical in place of the glycerol radical" of fat. The globulin of wheat is called "edestin." Meat is described as containing 0.07 to 0.32 per cent. of an "amide," which bears the name of "keratin." It is obvious enough what substance is being spoken of; but the name is not apparently a simple misprint, for it is thrice employed in one paragraph, and is to be found unaltered in the index.

In spite of the blemishes noted, the book, as a whole, is capable of filling a useful place, and there are many sections which deserve ungrudging commendation. This is especially true of the chapters dealing with the various important food crops, and with their application to the scientific feeding of animals and men. Here the author, speaking often as a first-hand authority, makes a discriminating selection of essential facts, and presents them in a manner at once accurate, lucid and interesting. Many tables of useful data are incorporated, and excellent diagrams illustrate graphically the comparative composition of important foods.

The reviewer can not approve the construction of a sentence like the following: "Iron . . . readily undergoes oxidation and rusting, due to the joint action of oxygen and water, and results in the production of a basic oxid of iron." Fortunately such lapses are infrequent, and the style of the book is in the main straightforward and readable.

ANDREW HUNTER

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Household Bacteriology. By ESTELLE D. BUCHANAN, M.S., Recently Assistant Professor of Botany, Iowa State College, and ROBERT EARLE BUCHANAN, Ph.D., Professor of Bacteriology, Iowa State College and Bacteriologist of the Iowa Agricultural